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April 17, 2013

ADDENDUM #1
This addendum consists of: 1 page and attached 19 pages

TO: ALL ASD PLAN HOLDERS

SUBJECT: ABBOTT LOOP, SCENIC PARK, & SUSITNA ES INTERCOM UPGRADES
ITB 2013-825

DUE DATE: **April 23, 2013**, 2:30 p.m. Anchorage Time

The following additions, corrections and changes are hereby made to the subject invitation to bid.

CHANGES TO SPECIFICATIONS:

1. Section 16735: **DELETE** this section in its entirety and **REPLACE** it with attached Section 16735 Wireless Clock System (4 pages).
2. Section 16752: **DELETE** this section in its entirety and **REPLACE** it with attached Section 16752 Integrated Communications System (15 pages).

CHANGES TO DRAWINGS:

1. Sheet AL-E3.1:
    a. Rooms 35 and 36**:** **CHANGE** new ceiling-mounted speakers to new wall-mounted speakers and **RELOCATE** to adjacent North walls. The intent is to stub conduits/cables into these spaces from above the adjacent corridor ceiling. CHANGE the flag notes pointing to these speakers to be Flag Note #14.
2. Sheet SU-E1.1:
    a. Office 102: **CHANGE** Note Flag #1 to Note Flag #12. **ADD** Sheet Note 12: "*REMOVE ALL EXISTING INTERCOM EQUIPMENT FROM EXISTING ROLLING CABINET. INSTALL NEW PROGRAM/SOURCE EQUIPMENT IN EXISTING CABINET AS SHOWN ON 1/SU-E2.1.*"
    b. Room 108: **ADD** Note Flag #1, pointing to intercom rack scheduled to be demolished.
3. Sheet SU-E2.1:
    a. Room 108: **ADD** Note Flag #1, pointing to location of demolished intercom rack shown on Sheet SU-E1.1.

NOTE TO BIDDERS: This addendum must be acknowledged in the space provided on the bid form. Failure to do so may cause your bid to be non-responsive.

END OF ADDENDUM

REVISED SPECIFICATION – ISSUED AS PART OF ADDENDUM #1

PART 1 GENERAL

1.1 WORK INCLUDED

A. Wireless clock system.

1.2 RELATED WORK

A. Section 16010 – Basic Electrical Requirements.

B. Section 16752 – Integrated Communications System.

1.3 SUMMARY AND SYSTEM DESCRIPTION

A. General: Furnish and install all equipment, accessories, and materials in accordance with these specifications and drawings to provide a complete and operating wireless clock system.

B. The system shall provide wireless precision time that is synchronized with the existing ASD server. Each component in the system shall use the synchronized time.

C. The network bell relay shall manage the bell schedules and provide an output to the intercom system at pre-defined times to initiate the bell/tone function.

D. Timing and operation of the wireless clock system shall be controlled by software provided residing on the manufacturer-provided hardware appliance (server).

E. The system shall incorporate fail-safe design so that failure of any component shall not cause failure of the system. Upon restoration of power or repair of failed component, the system shall resume normal operation without the need to reset the system or any component thereof.

1.4 REGULATORY REQUIREMENTS

A. Conform to all applicable NFPA 70 and FCC requirements.

B. Comply with IEEE Standard 802.11 b/g.

C. All equipment and assemblies shall be Underwriters Laboratories listed and classified if applicable.

1.5 QUALITY ASSURANCE

A. All equipment shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

B. Manufacturer: The Manufacturer shall be a nationally recognized company specializing in commercial wireless timekeeping systems.

C. Installer: The installation organization shall be a company specializing in the installation of intercom and clock systems and certified by the manufacturer of the submitted system.

This organization shall have a minimum of 3 years experience with installation of wireless timekeeping systems.

1.6 SUBMITTALS

A. Submit product data under the provisions of Division 1 and 16.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in factory containers. Store in clean, dry space in original containers. Protect products from fumes and construction traffic. Handle carefully to avoid damage.

1.8 OWNER TRAINING

A. As specified in Section 16999.

1.9 PROJECT RECORD DRAWINGS

A. Submit documents under provisions of Division 1 and Section 16999.

B. Show locations of all wireless clocks on intercom as-built drawings.

1.10 OPERATION AND MAINTENANCE MANUALS

A. Submit Operation and Maintenance data under provisions of Division 1.

B. Provide operation and maintenance instructions including detail electronic schematic drawings, detailed parts list and exploded view of all equipment, detailed troubleshooting instructions and a reduced set of the project record drawings.

1.11 WARRANTY

A. Warrant all materials and equipment to be new and free from defects in material and workmanship for a period of one year under provisions of Division 1. Warranty service shall be provided by a trained specialist of the equipment manufacturer.

1.12 EXTRA MATERIALS

A. None required.

PART 2 PRODUCTS

2.1 PRODUCT SPECIFICATIONS

A. Throughout this specification, specific manufacturers and manufacturer's catalog numbers are cited. These citations are for the purpose of establishing quality and performance criteria and are not intended to be proprietary. All decisions regarding approval of non-specified manufacturers and products will be at the discretion of the ASD Project Manager.

2.2 ACCEPTABLE MANUFACTURERS – WIRELESS CLOCK SYSTEM

A. Primex "Synchronous Network System (SNS)" or approved equal.

B. Substitutions under provisions of Division 1.

2.3 SNS APPLICATIONS MANAGEMENT PLATFORM (AMP)

A. Existing software to provide management of all wireless clocks, network bell relays, hardware server, and all other components connected to the wireless clock system. Software utilizes two-way communication between devices to maintain clock synchronization, as well as provide diagnostic reporting of battery level and access point signal level. The AMP also has the ability to upload any firmware updates and adjust device settings.

2.4 HARDWARE SERVER

A. The existing Primex server currently resides at Williwaw Elementary School. The Contractor shall relocate the server to the ASD Data Center as part of this project. Provide all labor, materials, and factory-authorized assistance to accomplish this task. Coordinate with ASD for exact date of transfer and coordinate with Primex for assistance with server restart and any programming that may be required. The server shall be relocated at the beginning of the project, so that the clocks at Williwaw are offline for no more than (7) calendar days.

2.5 SOFTWARE LICENSING

A. Time Sync Software: Primex #SNSCLK2K-12U or approved equal license upgrade for 150-499 clocks.

B. Bell Scheduler Software: Primex #SNSBEL1K-23U or approved equal license upgrade for 6-10 sites.

2.6 NETWORK BELL RELAY

A. Primex #SNSBRL105 or approved equal network bell relay to manage and control bell schedules. The unit shall have the following features:
   1. I/O Interface: 2 relay outputs, 4 digital inputs, 4 universal inputs, and 4 digital outputs.
      a. 2 relay outputs.
      b. 4 digital inputs (0-12V).
      c. 4 universal inputs (analog 0-5/10V or digital 0-12V).
      d. 4 digital outputs (open collector, 24V)
   2. Serial Interface: 600-19200 Baud.
   3. Network Interface: RJ45 10/100 Ethernet
   4. Protocols: TCP/IP, UDP, DHCP, Modbus/TCP, SNMP.
   5. HTTP web server for control, status, and configuration.
   6. Hard Drive: Minimum 160GB SATA.
   7. Memory: 2GB DDR2.
   8. Mounting: Rack-mount 1RMU chassis.

B. Unit shall have web-based software for schedule entry and management, using either local or remote access. Unit shall provide for special or temporary schedules, such as early release, half days, or other occasional functions that deviate from the standard schedule. Unit shall provide ability to create zones and access profiles for multiple users.

2.7 WIRELESS CLOCKS

A. Wireless clocks shall have the following features:
   1. Transmitter: Integral 802.11 b/g radio.
   2. Connections: RJ45 Ethernet port.

3. Housing: High-impact polycarbonate frame and lens with black housing and white face, designed for wall-mount applications. Modify existing clock/speaker backboxes as necessary to accommodate wireless clocks.
4. Battery: Provide D series alkaline batteries.
5. Supported Protocols: WEP, WPA, WPA2, PEAP, EAP-FAST, LEAP.
6. Diagnostics: Clock shall provide wireless connection strength, battery life, and synchronization data to the AMP.

B. Provide clocks as follows:
1. Classrooms and Offices: Primex #SNS4Z155 clock with 12.5" face.
2. Gymnasium: Primex #SNS4Z163 clock with 16" face. Provide with Primex #14123 wireguard where shown on the Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine conditions, with the Installer present, for compliance with requirements and other conditions affecting the performance of the Integrated Communications System.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install system in accordance with NFPA 70 and other applicable codes. Install equipment in accordance with manufacturer's written instructions.

B. Mounting Heights:
1. Existing Locations: Where not otherwise noted on the Drawings, all new devices at existing locations shall be mounted on or in the existing backboxes. Bring any questions or deviations to the attention of the ASD Project Manager.
2. New Locations: Coordinate with ASD Project Manager for exact location and mounting height prior to installation.

C. Remote Access: Coordinate with ASD to obtain an IP address for remote access to the clock system via the ASD WAN connection.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a factory-authorized service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.

B. Testing: Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor's expense. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

C. Cleaning: Prior to final acceptance, clean system components and protect from damage and deterioration.

D. Provide Owner training as specified in Section 16999.

END OF SECTION

REVISED SPECIFICATION – ISSUED AS PART OF ADDENDUM #1

PART 1 GENERAL

1.1 WORK INCLUDED

A. Integrated communications system.

1.2 RELATED WORK

A. Section 16010 – Basic Electrical Requirements.

B. Section 16123 – Wire and Cable.

C. Section 16132 – Raceway and Boxes for Electrical Systems.

D. Section 16735 – Wireless Clock System.

1.3 SUMMARY AND SYSTEM DESCRIPTION

A. General: Furnish and install all equipment, accessories, and materials in accordance with these specifications and drawings to provide a complete and operating Integrated Communications system.

B. This Section specifies requirements for an intercom, master clock, public address, and program system which includes, but is not limited to, the following:
1. Central processor assembly.
2. Telephone controlled intercom system
3. PC Attendant.
4. Bell/class change signaling system.
5. Public address/intercom system.
6. Administrative telephone (ATEL).
7. Standard wall telephone, DTMF type (STEL).
8. Standard desk telephone, DTMF type (STEL).
9. Classroom call-in switches.
10. Ceiling/wall mounted speaker assemblies.
11. Wall-mounted paging horns.
12. Controls, amplifiers, and terminal equipment.
13. Power supplies.
14. Wiring.
15. Volume attenuators.
16. Master clock.
17. Secondary clocks.
18. Program sources – tuner, cassette, CD.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. All systems shall comply with applicable federal, state, and local building codes. Conduit and wire installation shall comply with all of the provisions of Division 16, with the requirements of Article 725 of the National Electrical Code for Class 2 Signaling Systems, and with manufacturer's wiring diagrams.

C. All equipment and assemblies shall be Underwriters Laboratories listed and classified if applicable. All of the communications system equipment, including controllers, intercoms,

clocks, power supplies, and sound system components shall be listed by Underwriters Laboratories as conforming to UL 1076 and UL 294.

1.5 QUALITY ASSURANCE

A. All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

B. The Contractor shall be an established communications and electronics contractor that has had and currently maintains a locally-run and operated business for at least five years. The Contractor shall utilize an authorized distributor of the equipment supplied for this project location with full manufacturer's warranty privileges.

C. The Contractor shall show satisfactory evidence, upon request, that the Supplier maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Supplier shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

D. Except where specifically noted otherwise, all equipment supplied shall be the standard product of a single manufacturer.

1.6 SUBMITTALS

A. Submit shop drawings and product data under the provisions of Division 1 and 16.

B. Provide manufacturer's data sheets on all equipment proposed for use on this project.

C. Electronic AutoCAD® drawings of the building floor plans are available upon request for preparation of the shop drawings. All device locations shall be reviewed and verified by the Contractor prior to completion of the shop drawings.

D. Provide contract-size shop drawings that include the following information:
1. Locations of all equipment and field devices, as well as routing of all cables with the number and size of conductors in each run. Scale of floor plan shall match Contract Drawings.
2. Scaled rack elevation drawing showing all equipment, including major components such as intercom card cage and controller, as well as any other equipment such as relays, miniature amplifiers, etc.
3. Locations and sizes of all raceways and penetrations. Fire-rated penetrations shall be specifically noted.
4. Provide a one-line diagram of the system that shows the signal relationships of all devices within the building.
5. For each major component, such as clock or speaker, show a typical detail of all wiring connections to the equipment. This detail shall include all wire/cable color-coding and all identification tags where applicable.
6. Show the locations of all clock power supplies throughout the building and show which secondary clocks are connected to each supply.
7. Indicate electrical characteristics and connection requirements, including line voltage and low voltage wiring, and logic diagrams or block diagrams where required. All text on the drawings shall be legible without magnification when the shop drawings are reduced to 11” x 17”.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in factory containers. Store in clean, dry space in original containers. Protect products from fumes and construction traffic. Handle carefully to avoid damage.

1.8 OWNER TRAINING

A. As specified in Section 16999

1.9 PROJECT RECORD DRAWINGS

A. Submit documents under provisions of Division 1.

B. Provide contract-size reproducible documents showing the as-built location of all devices, conduit routing, and all junction box locations.

C. Provide a one-line diagram of communications system and building floor plan showing outlet and equipment locations, in both printed 11” x 17” and AutoCAD format. Provide a listing of all call station, speaker, and zone numbers, in both typed and Microsoft Excel format. Mount printed documents in 8.5” x 11” clear plastic sleeve attached to intercom rack. Provide electronic documents submitted with the O&M manuals.

1.10 OPERATION AND MAINTENANCE MANUALS

A. Submit Operation and Maintenance data under provisions of Division 1.

B. Provide operation and maintenance instructions including detail electronic schematic drawings, detailed parts list and exploded view of all equipment, detailed troubleshooting instructions and a reduced set of the project record drawings.

1.11 WARRANTY AND MAINTENANCE CONTRACT

A. Warrant all materials and equipment to be new and free from defects in material and workmanship for a period of one year under provisions of Division 1. Warranty service shall be provided by a trained specialist of the equipment manufacturer.

B. The Contractor shall offer the Owner an annual service contract at the end of the one-year warranty period. Acceptance or rejection of the service contract will be the Owner's option.

1.12 EXTRA MATERIALS

A. No spare parts are required.

PART 2 PRODUCTS

2.1 PRODUCT SPECIFICATIONS

A. Throughout this specification, specific manufacturers and manufacturer’s catalog numbers are cited. These citations are for the purpose of establishing quality and performance criteria and are not intended to be proprietary. All decisions regarding approval of non-specified manufacturers and products will be at the discretion of the ASD Project Manager.

2.2 ACCEPTABLE MANUFACTURERS – INTEGRATED COMMUNICATIONS SYSTEM

A. Dukane STARCall Plus.

B. Substitutions under provisions of Division 1.

2.3 SYSTEM REQUIREMENTS AND FEATURES

A. Provide complete and satisfactorily operating Intercom and Communications System as described herein, using materials and equipment of types, sizes, ratings, and performances as indicated. Use materials and equipment that comply with referenced standards and manufacturer's standard design and construction, in accordance with published product information. Coordinate the features of all materials and equipment so they form an integrated system, with components and interconnections matched for optimum performance of specified functions.

B. The system shall be capable of distribution using DTMF Standard Telephones (STELs), Caller ID telephones (CTELs), loudspeakers, and other devices as described herein. The system shall be capable of incorporating a Windows XP® based GUI application (a PC Attendant), allowing control of all functions. The system central equipment shall provide at least 32 simultaneous, global voice speech paths between all telephones in the system. Each of these channels shall operate simultaneously and transparently to all other communications paths. The system shall provide four independent intercom channels between any telephone and loudspeakers. Two additional, simultaneously operating channels shall be provided for distribution of program material.

C. The system shall allow for configuration, programming, and diagnostics to be done on-site or from a remote location via telephone modem connection with Ethernet device server, as specified later in this section. All configuration, programming, and diagnostics shall be done using a Windows XP® based software program.

D. System Wiring Topology: The integrated communications system shall be capable of utilizing the unshielded twisted pair (UTP) telecommunications cabling in the building, as specified in Section 16755, for connection of all STEL and CTEL telephones. This ability shall be proven and fully endorsed by the system manufacturer. Systems that require shielded cables for this purpose are not acceptable.

E. Room Assignments: The system shall provide user-programmable room number assignments. Any room number may be reassigned at any time, and it shall not be dependent on wiring or circuit numbers. Room number assignments shall be 3-, 4-, or 5-digit numeric and shall be assigned using the numbering system approved by the ASD Project Manager. This numbering system may or may not utilize the architectural room numbering shown on the Drawings. The dialing sequence shall incorporate full numeric capabilities as available on industry-standard telephone keypad.

F. Call Routing: Call-ins from rooms shall be programmed to a minimum of seven priority levels. Upon arrival at the designated ATEL, the call shall be visually displayed and audibly annunciated. Calls from call-in devices may be programmed to call into STELs, which shall ring when called. The system shall be capable of providing PBX integration, allowing PBX operators to handle calls from telephones connected to the PBX, as well as internal telephone and intercom calls.

G. Telephone Compatibility: The system shall be compatible with industry-standard 2500 DTMF telephone instruments with electronic ringers (STELs).

H. System Port Capacity: The system shall support a maximum of 32 trunk ports. The maximum number of system ports including all audio, input, and output ports shall be

1,024. These ports shall be capable of being configured to support all combinations of ATELs, CTELs, STELs, ICC ports, OCC ports, and loudspeaker stations. The system shall be expandable in groups (ports) of four for the ATELs, and 16 for the STELs and speakers.

I. System Tones: The system shall provide a minimum of 26 distinct user-programmable system tones, each of which shall be programmed from a selection of up to 22 tone types and two program sources. These tones shall be programmable by type, level, and duration, as desired. The following programmable system tone events shall be available:
1. Emergency page pre-announce.
2. Civil emergency.
3. Auxiliary alarm.
4. Emergency reminder tone.
5. Page pre-announce.
6. Normal reminder tone.
7. Custodial tone.
8. Door tone.
9. Intercom pre-announce.
10. Privacy tone.
11. Event tones 1–16

J. System Paging: The system shall have a minimum of 32 user-assignable groups of stations for zoned audio paging. The system shall allow each field station or paging speaker to be a member of up to 32 multipurpose zones, or no zone. Paging may originate from any master station and shall exclude the local loudspeaker associated with the source of the page. The system shall allow a telephone to be associated directly with a loudspeaker by assigning them the same dial number. The system shall include programmable page or intercom priority over class change tones and preprogrammed events. Class change tones occurring simultaneously with an all page or zone page shall be programmable to be delayed until the active page has concluded. Communications with each classroom loudspeaker shall be hands-free. The staff member or occupant in the classroom need not operate any buttons to reply to a call. Initially, fully functional programmed zones shall be provided as noted below. Coordinate with the ASD Project Manager to determine exactly which speakers in which areas will be included in each zone.
1. Zone #1 - Interior classrooms, relocatable classroom buildings.
2. Zone #2 – Corridors, restrooms, janitor rooms, mechanical rooms.
3. Zone #3 – Gymnasium, library, MPR.
4. Zone #4 – Exterior speakers.
5. Zone #5 – Offices, administrative areas, and work rooms.
6. Zone #6 – Spare.
7. Zone #7 – Spare.
8. Zone #8 – Spare.

K. Audio Priorities: All audio functions in the system shall operate within the following priority scheme:
1. A lower priority event shall be interrupted by a higher priority event.
2. Interrupted lower priority functions (automatic) shall be restored after conclusion of the higher priority function. If an event is initiated while a page is occurring, the event shall be optionally delayed until the page is complete.
3. Telephone conversations shall not be interrupted by the above listed functions.
4. The following priorities are ranked from highest to lowest;
5. Emergency intercom
6. Emergency page
7. Civil emergency
8. Manual time tone and high priority event tone
9. All call and zone page

10. Intercom
11. Custodial tone
12. Low priority event tone
13. Program distribution
14. Call-in priorities shall be assignable to any one of three levels of normal calls and three levels of emergency calls. If a normal/emergency call-in station is used, a normal call shall be remotely upgraded to an emergency call by pressing the call button twice.
15. Normal and emergency priority levels shall provide a distinctive call-in ring with a programmable cadence.

L. Incoming Calls: The system shall distinguish between an emergency call and a normal call from any station, and automatically route each type of call-in to the designated ATEL or STEL destination group's call-in queue shall be placed in the order of priority and time of origination. The system shall have the following features relating to incoming calls:
1. The caller shall be able to change a normal call-in to an emergency call at any time. This shall be configurable on a port-by-port basis.
2. Emergency calls received at the ATEL shall cause the calling station identification number to flash in the display. Normal calls shall be displayed steadily.
3. The system shall include provisions to allow call-in coverage to be redirected to an assigned coverage group manually or at a preprogrammed time of day, or if the call-in is not answered within a user-defined period of time.
4. When a call-in occurs to a specific call destination group, the call-in shall ring at all ATELs and STELs in the assigned group. Any telephone within the group shall be able to answer the call. Telephones not within the call group can also answer using a dial code.
5. When a call-in is not answered within a user-designated programmable time an annunciate tone sounds on speakers and the call-in shall be re-directed to other call groups. The call-in then shall be answered at any ATEL or STEL by dial code.
6. Calls to the ATEL or STEL from a classroom shall be audibly distinguishable, using different ring cadence, depending on if the call originates from the telephone as a telephone call or call-in from either the telephone or call-in button.

M. Outgoing Calls: ATEL and STEL calls to other telephones shall ring the appropriate telephone and be connected when the called party goes off-hook. The system shall allow any telephone to be programmed to allow or exclude initiation of all call, zone page, or emergency announcements.

N. Telephone Interface: The system shall provide an interface to allow incoming calls from the Centrex telephone system to be routed to any ATEL or STEL.

O. Classroom/Area Device Configuration: The system shall provide the capability for a loudspeaker station, handset, and up to three call-in devices at each remote location or classroom. The system shall have the following features relating to device configuration:
1. When an STEL is located in the classroom, the user shall have the ability to toggle back and forth between conversing on the telephone or the speaker station.
2. If a call is placed to a classroom loudspeaker, the call is automatically transferred to the handset when the handset is lifted. This is a user-programmable option on a telephone by telephone basis.
3. In a room equipped with a loudspeaker, if the handset is off-hook and a call is placed to that room via the loudspeaker, the caller's voice shall be automatically received in the room. This allows the caller to contact an individual room and carry on two-way communications even though the telephone is off-hook. Two separate and distinct voice paths shall be available to each classroom. Systems that require the caller to re-dial the individual room or wait in a queue shall not be acceptable.

4. The system shall accommodate call-in devices consisting of single or multiple switch assemblies, with or without privacy switch capabilities, and with or without call assurance LED capabilities.

P. Telephone Features: The ATELs and STELs shall be capable of, but not restricted to, the following features:
1. Two simultaneous, three-party conference circuits
2. Extension-to-extension direct dialing
3. Extension-to-speaker station direct dialing
4. Call on hold
5. Call transfer
6. Paging, including password-protected administrative paging functions (i.e. All Call) that are accessed from any STEL.
7. Tone distribution
8. Preprogrammed speed dialing
9. Call forwarding
10. Interface with electronic key system and/or PBX
11. The system shall allow any preprogrammed telephone parameter to be circumvented through the use of a pre-assigned password. Upon hanging up, the telephone returns to its previously programmed state. Passwords are available allowing for staff and administrative programming override.
12. The following programmable attributes shall be available for each telephone:
13. Dial access
14. Telephone ring access
15. Direct off-hook call-in answer
16. Timed off-hook duress call-in
17. Page access
18. Direct off-hook intercom speaker-to-handset transfer
19. Emergency ring access
20. Normal ring access
21. Direct off-hook page or telephone call
22. Direct off-hook intercom answer

Q. Clock System Interface: Provide an interface with the wireless clock system to generate class change tones. Provide all programming and accessories as required to obtain the specified sequence of operation.1. Coordinate with ASD for exact bell schedule for each site.

R. Auxiliary Output: The system shall include facilities to allow automatic control of external devices such as door locks. A total of eight outputs shall be provided. Outputs may be activated manually from an ATEL or STEL and shall be programmable by the installer/system administrator to activate during any desired system activity (e.g., page, tone, program, time of day).

S. The system shall provide up to two simultaneously operating, non-restrictive, multiple input source, program distribution channels. This functionality shall be programmed and distributed from ATELs or STELs. The system shall provide restriction of programming channels from all or certain designated telephones.

T. In rooms provided with a privacy switch, the system shall incorporate all necessary circuitry to prevent overhearing conversations in any room equipped with a loudspeaker. The ATEL shall provide the user with an indication that the classroom privacy switch is in the privacy mode.

U. Each dialing administrative telephone in the system shall be programmable for the following options:
1. Allow zone paging.

2. Allow all-page announcements.
3. Allow executive override.
4. Allow Emergency paging.
5. Allow activation of Time Zone tones.
6. Set the priority level and target display of "normal" calls.
7. Set the priority level and target display of "emergency" calls.
8. Assignment of architectural number.
9. Class of Service.
10. Assignment of associated speaker to paging zone.
11. Automatic call-back-busy.
12. Call forward-no answer.
13. Call forward-busy.
14. Allow activation of security monitoring functions on a per room and per zone basis.

V. Amplified two-way voice communication shall be available from any administrative telephone in the system, through any speaker in the system. This shall allow hands-free communication to any classroom or any individual loudspeaker unit. A programmable pre-announce tone shall sound immediately before the intercom path is opened and a supervisory tone shall continue to sound at regular intervals when speaker monitoring is active.

2.4 CENTRAL SWITCHING EXCHANGE

A. The Central Switching Exchange (CSE) shall be microprocessor-controlled and include pulse amplitude modulators for internal speech transmission. The CSE mainframe shall be modular, expandable for optimum station configuration, and capable of future expansion by adding additional station line cards and/or exchanges as required. The CSE shall be a fully non-blocking system to allow simultaneous telephone handset to telephone handset communications paths as required. Through the use of expansion modules, the system capacity shall be easily expanded to accommodate future requirements. The CSE shall provide direct dialing and private two-way telephone communications between all locations equipped with ATELs or STELs as shown on the Drawings.

B. The system should have complete interconnect capabilities to the local telephone company central office lines. To accomplish this, the system must be registered with the FCC and have a registered ringer equivalence number. (Note: Provide ringer equivalence number as part of the submittal.) It must also be capable of interconnecting to a PABX. It shall be possible to transfer any interconnected circuit to any station in the system. Access to outside lines shall be limited to certain authorized telephones via software programming.

C. The integrated communications system shall provide for the direct connection of outside trunks. Systems that require the use of line amplifiers shall not be accepted. The system shall be capable of connecting to 32 loop start central office trunks or KSU/PBX extensions.

D. The system shall provide all standard telephone company signaling to interface with other special services such as off-premises extension, Watts, and Centrex.

E. The Central switching Exchange shall have the following components. Provide quantities of each component as required for a complete and operable system as specified in the Contract Documents:
1. Card Cage: Provide capacity for holding all necessary control and line cards, as well as paging amplifiers. Provide expansion chassis if required.
2. Memory: Non-volatile user-configurable memory, time-based system reconfiguration, and built-in diagnostics.

3. Central Processor: Contains system software to manage connections between different types of line cards and the routing card. Software shall be capable of being upgraded from a PC, either directly or via modem. Dukane #SCR+ or approved equal. Provide the latest version of the system firmware from the manufacturer.
4. Expanded Standard Telephone Line Card: Provides connection for up to 32 STEL telephone stations. Dukane "STC-E" #110-3531 or approved equal.
5. Protected Balanced Telephone Line Card: Provides connection for up to 16 standard 2500 DTMF telephones (corded or cordless) with electronic ringers. Dukane "BTC-P" #110-3775B or approved equal. Use balanced telephone card for intercom telephone handsets that are connected to the intercom system via the UTP telecommunications cabling system in the building.
6. Administrative Telephone Card: Provides termination for up to 4 ATEL stations. Dukane "ATC-E4" #110-3527A or approved equal.
7. Expanded Audio Switching Card: Provides switching and termination for any combination of 16 field intercoms, paging speakers, and call-in switches, using 2 audio buses and 6 audio channels. Dukane "ASC-E" #110-3534A or approved equal.
8. Trunk Interface Card: Provides connection of up to 8 ports to the ASD Centrex telephone network. Dukane "TIC-E8" #110-3552B or approved equal.
9. Remote Programming and Diagnostic Package (RAPID): Provides remote configuration of system parameters using a separate PC or via modem connection. Dukane #437-00120 or approved equal. Provide modem in unit as required to accomplish intended function.
10. Bi-directional intercom amplifier that shall be capable of delivering a minimum of 12 Watts RMS at 25V, or as required for all connected devices.
11. Interior Paging Amplifier: Solid-state amplifier with audio output of 125 Watts at less than .5% distortion. Frequency response shall be flat from 40 to 15,000 Hz and noise level shall be at least 96 dB below rated output. Dukane #1A4125 or approved equal. Provide (2) interior paging amplifiers per site.
12. Exterior Paging Amplifier: Solid-state amplifier with audio output of 60 Watts at less than .5% distortion. Frequency response shall be flat from 40 to 15,000 Hz and noise level shall be at least 96 dB below rated output. Dukane #1A4060 or approved equal.
13. Integral Power Supply: 12V DC at 4 Amps, 5V DC at 2 Amps.
14. Filter: Active full-time filter to improve audio intelligibility.
15. Head-end equipment shall incorporate a device to protect all solid state equipment against power line surges and power line over-voltages which destroy transistors.
16. Device Server: DigiOne #SP or approved equal serial-to-Ethernet interface, used to assign an IP address for remote connection of intercom system to the ASD WAN. Unit shall support baud rates up to 230 Kbps, with full modem and hardware flow control, modem emulation, and RS-232/422/485 protocol selection.

2.5 AUDIO COMPONENTS

A. AM/FM Stereo Tuner: Teac #T-R670 or approved equal digital tuner with 60-station preset memory (30 AM and 30 FM), manual/auto preset tuning, AM/FM antenna connections, and IR remote. Provide with rack-mount kit.

B. iPod Docking Station: Numark model iDEC or approved equal rack-mounted, 2RMU iPod dock. Unit shall have RCA outputs, USB audio interface, on-board controls, integral charging power supply, and docking station for multiple iPod models.

C. Monitor Panel: Lowell #MP-2 or approved equal rack-mounted, 2RMU, active/passive monitor panel for monitoring audio components connected to the system. Panel shall have 12 x 1 selectable visual and aural monitoring, six channels for line level inputs

(-10dBv to +10dBv), six channels for speaker level inputs (0-70V). Panel shall have analog meter with VU and voltage scales responding to the line or speaker channel selected. Aural monitoring is done through either integral 3" x 5" speaker or headphone output jack responding to the line or speaker channel selected. Provide with UL listed external power supply.

D. Powered Antenna: Terk #AF-1 or approved equal powered AM/FM antenna with 15dB AM gain, -20 to +44dB FM gain, and omnidirectional reception pattern. Plug antenna into power strip in rack and secure either inside or to back of rack, depending on signal strength.

2.6 ADMINISTRATIVE TELEPHONE (ATEL)

A. Dukane #7A1110 or approved equal. Administrative telephones shall provide functions as scheduled below:
1. One button dialing of most commonly dialed number or numbers.
2. Eight user-programmable function keys.
3. Facilities for multiple operations simultaneously without interference with an established pattern of priorities for all administrator/classroom communication capabilities.
4. Complete station software assignment including class of service, speed call numbers, and any other features assigned without any wiring changes being required.
5. Facilities to permit the distribution throughout the facility of emergency announcements, all-page announcements, zone-page announcements and emergency/evacuation alert if authorized through class of service.
6. Facilities to enable use of features without the use of "hook switching".
7. A 16-character LCD display shall provide alphanumeric station number and priority status, function, and digital clock indication.
8. Facilities for receiving staff station and/or emergency calls with single button response.
9. Provide saved number redial function.

2.7 STANDARD TELEPHONE (STEL)

A. All telephones shown on the Drawings are existing to remain and each telephone is currently connected directly to the existing intercom system. The new intercom system shall provide the same function for all existing staff telephones, as well as provide full functionality for new telephones that are connected via the existing building LAN.

B. Standard telephone shall be Industry-standard FCC-compliant 2500 DTMF telephone with built-in network and electronic ringer. Cortelco #T-909A or approved equal. Verify color with ASD Project Manager prior to submittal. All STELs shall be equipped as standard telephones that are not proprietary in nature and are not unique to the supplier of the communications system. Telephones shall be equipped with a modular connector and shall be suitable for desktop or wall-mounting, The STELs, shall include the following functions and capabilities:
1. The ability to function as a standard DTMF telephone allowing station-to-station calls. Station-to-station dialing shall allow any STEL to call any other ATEL, STEL, or speaker station in the system.
2. The ability to initiate and participate in three-party conference calls.
3. The ability to transfer a call to another ATEL or STEL.
4. The ability to place calls on hold.
5. The ability to automatically answer a classroom call-in by lifting the handset, thus going off-hook.
6. The ability to dial alphanumeric dial numbers.
7. The ability to initiate normal or emergency all call pages.

8. The ability to initiate normal or emergency zone pages, inclusive of certain zones or rooms.
9. The ability to initiate normal or emergency zone pages, excluding certain zones or rooms.
10. The ability to initiate an automatic normal or emergency zone page when the telephone is off-hook. This announcement can be configured for any combination of loudspeaker zones.
11. The ability to distribute tone signals to all loudspeaker zones simultaneously, to include only certain loudspeaker zones, or to exclude certain zones from receiving the tone signals.
12. The ability to distribute tone signals to all rooms simultaneously, to include only certain rooms in the distribution, or to exclude certain rooms from receiving the tone signals.
13. The ability to distribute program material, such as music, from programmed sources, to all zones simultaneously, to include only certain zones, or to exclude certain zones.
14. The ability to distribute program material, such as music, from programmed sources, to all rooms simultaneously, to include only certain rooms, or to exclude certain rooms.
15. The ability to cancel the program distribution or switch to another program channel at the conclusion of program distribution.

C. Provide a total of (105) new STELs for this project (35 per school). Each STEL shall be connected to the intercom system via one of the existing telecommunications jacks in the building. The exact rooms where STELs are installed shall be determined by the ASD Project Manager during the shop drawing submittal review process so that the Contractor can program the intercom system to correctly identify each station. The exact location of the STEL within each room will be determined by the ASD Project Manager prior to Substantial Completion and the Contractor shall cross-connect between the intercom and telecommunications system as required to provide a communication pathway between each STEL and the intercom system head-end equipment.

2.8 CLOCK EQUIPMENT

A. Specified in Section 16735.

2.9 SPEAKERS, BAFFLES, ENCLOSURES

A. Interior Speakers, Baffles, and Backboxes.
1. In all areas unless otherwise noted, provide Dukane #5A606 or approved equal speaker/transformer assembly with 8” dual-cone speaker, 4.8-ounce ceramic magnet, 8-Watt RMS power output, 91 dB SPL, and 90-15,000 Hz frequency response. Provide with dual-winding 25V/70V matching transformer with taps at ½, 1, 2, and 4 Watts, at 25V and 70V operation.
2. Existing Combination Clock/Speaker Locations: Mount new speaker in existing backbox. Re-use baffle if compatible with new speaker and clock. Otherwise, replace baffle.
3. Existing Recessed Ceiling Speaker Locations: Mount new speaker in existing backbox.
4. New Recessed Ceiling Speaker Locations: Mount speaker in Dukane #8A301 or approved equal recessed backbox. Provide Dukane #677-67 tile bridge for box support.
5. All Recessed Ceiling Speaker Locations: Provide Dukane #6A342B baffle.
6. Surface-Mount Wall Speakers: Provide Lowell #DSL810-72 or approved equal surface-mounted, slope-front speaker assembly with painted steel backbox, 8” speaker, 70/25V transformer, and square steel baffle.

7. Surface-Mount Ceiling Speakers: Provide Lowell #DSQ810-72 or approved equal surface-mounted speaker assembly with painted steel backbox, 8" speaker, 70/25V transformer, and square steel baffle.

B. Exterior Speakers, Baffles, and Backboxes.
1. All backbox-mounted exterior speakers shall be Atlas Sound #APF-15T or approved equal double-reentrant, high efficiency, 7" diameter speaker with 15-Watt RMS output, 102 dB SPL, 480-14,000 Hz frequency response, 25V/70V multi-tap transformer, and 95° horizontal and vertical dispersion. Mount speaker in Atlas Sound #SE161-R6 or approved equal surface-mounted backbox with Atlas #VP161A-R8 vandal-proof baffle.
2. At the entrance canopies, soffits, and other areas with recessed wall or ceiling-mounted exterior speakers, mount speaker in Atlas Sound #193-8-6 or approved equal recessed backbox with Atlas #VP161-APF vandal-proof baffle.
3. At exterior pole-mounted locations, provide Atlas Sound #AP-15T or approved equal double-reentrant, high efficiency, 7" diameter speaker with 15-watt continuous output, 116 dB SPL, 400-14,000 Hz frequency response, 25V/70V multi-tap transformer, and 70° x 70° horizontal and vertical dispersion. Speaker shall have UV-resistant weatherproof ABS housing and rotating locking base.

2.10 PERIPHERAL EQUIPMENT

A. Intercom Call-In Switch: Dukane #PCS499 or approved equal call-in switch with call-in and privacy capability. The switch shall be a three-position (privacy, off, and call) rocker switch with momentary contact for call-in and maintained contact for privacy.

B. Enclosed Equipment Rack: Atlas Sound #WA200 series or approved equal UL listed, 16-gauge steel enclosed rack with 18" cabinet depth, 35 RMU (65.5"H) of available vertical mounting space, adjustable rack rails, hinged rear door with keyed flushlock, and black finish. Rack shall be mounted on casters, sized for the rated load and recommended by the manufacturer.

C. Program/Source Equipment Cabinet (Scenic Park only): Middle Atlantic #DWR 10-17 or approved equal UL listed, 16-gauge steel sectional wall cabinet with 15" center cabinet depth (17" overall depth), 10 RMU (24.5"H) of available vertical mounting space, hinged rear section, vented panels, no front door, and black finish.

2.11 CABLING

A. Intercom Cable – New Speakers and Call-In Switches: 20 AWG, stranded, copper, with one twisted unshielded pair and an overall plenum jacket. West Penn #25222 or approved equal

B. Intercom Voice Backbone Cable: Plenum-rated CL2P, Category 3, 24 AWG, solid copper conductor multi-pair voice backbone cable. Berk-Tek #10032xxx or approved equal or approved equal (xx in part numbers = pair count, as shown on Drawings). Provide for cross-connect between intercom patch panel and intercom system head-end equipment.

C. Intercom-Telephone Backbone Cables: UL listed, plenum-rated CL2P, Category 6, 4 pair, 24 AWG, solid copper conductor. Berk-Tek "LanMark 1000 CMP" or approved equal. Provide for cross-connect between the telephone punchdown blocks and the intercom cabinet to obtain dial tone capability through the desktop intercom stations

D. Intercom Cross-Connect Patch Cables: Factory-terminated 7-foot Category 6 patch cables with yellow jacket. Ortronics #OR-MC607-04 or approved equal. Provide for cross-connect between the intercom patch panel and the telephone patch panels in the racks. Provide (30) cables per school for cross-connect of intercom telephones.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine conditions, with the Installer present, for compliance with requirements and other conditions affecting the performance of the Integrated Communications System.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install system in accordance with NFPA 70 and other applicable codes. Install equipment in accordance with manufacturer's written instructions.

B. Wiring Methods: All low-voltage intercom system cables shall be installed in cable tray, J-hooks, or raceway. All line-voltage wiring shall be installed as specified in Section 16123.

C. Impedance and Level Matching: Carefully match input and output impedance's and signal levels at signal interfaces. Provide matching transformers where required.

D. Mounting Heights – Existing Locations: Where not otherwise noted on the Drawings, all new devices at existing locations shall be mounted on or in the existing backboxes. Bring any questions or deviations to the attention of the ASD Project Manager.

E. Mounting Heights – New Locations: Where not otherwise noted on the Drawings, coordinate locations of outlet boxes and backboxes for new devices at new locations to obtain the mounting heights to center of devices as specified below. The Contractor shall review all architectural drawings and field verify mounting heights prior to rough-in. Bring any questions or deviations to the attention of the ASD Project Manager.
   1. Call-In Stations: +52" AFF.
   2. Exterior Wall-Mounted Speakers: New locations at +10'-0" AFF, with final location and mounting height to be determined by ASD Project Manager.

F. Control Circuit Wiring:
   1. Install control circuits in accordance with NFPA 70 and as indicated. Provide number of conductors as recommended by system manufacturer to provide control functions indicated or specified.
   2. All the communications wires shall be laid down on terminal punch blocks and identified by the actual room location served, in accordance with Section 16075.
   3. All labels shall match the numbering scheme shown on the shop drawings and project record drawings.
   4. Make installation in strict accordance with approved manufacturer's drawings and instructions.

G. Wiring Within Enclosures:
   1. Provide adequate length of conductors. Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars.
   2. Provide physical isolation from each other for speaker-microphone, line-level, speaker-level, and power wiring. Run in separate raceways, or where exposed or in same enclosure, provide 12-inch minimum separation between conductors to speaker-microphones and adjacent parallel power and telephone wiring. Provide physical separation for other conductors, as recommended by equipment manufacturer.

H. Splices, Taps, and Terminations: Make splices, taps and terminations on numbered terminal punch blocks in junction, pull, and outlet boxes, terminal cabinets and equipment enclosures. All splices shall be labeled at each termination point with the station or room designation. Provide a laminated terminal block schedule for the 66-blocks in the terminal cabinet behind the intercom rack. Mount schedule on inside of cabinet door.

I. Identification of Conductors and Cables: As specified in Section 16075.

J. Weatherproofing: Provide weatherproof enclosures for items to be mounted outdoors or exposed to weather.

K. Remote Access: Coordinate with ASD to obtain an IP address for remote access to the intercom system via the device server and ASD WAN connection.

L. Speaker Taps: Coordinate with ASD Project Manager for exact tap settings of all speakers.

3.3 CABLE INSTALLATION

A. Follow cable manufacturer's specification regarding handling methods, retaining/support methods, bending radius and maximum pulling tension limitations. Where manufacturer does not provide bending radius information, minimum bending radius shall be 10 times the diameter of the cable. Use a tension-monitoring device to ensure that the maximum pulling tension that may be applied to the cable to be pulled into a conduit section is not exceeded. Provide replacement cable if cable manufacturer's maximum pulling tension is exceeded at any time during a pull.

B. Cable shall be carefully inspected for sheath defects or other irregularities as it is paid out from the reel. When defects are detected, pulling shall stop immediately and the cable section shall be repaired or replaced at the discretion of the Owner. A system of communications shall be maintained between pulling and feed locations so that pulling can be stopped instantly, when required.

C. Adequate care shall be exercised when handling and storing reels of cable to prevent damage to the cable. Cable with dents, flat spots, or other sheath distortions shall not be installed.

D. All cabling shall be run continuous with no splices between termination points.

E. All cable shall be routed in such a way as to minimize EMI and RFI interference. Cables shall be routed to maintain the following minimum distances from noise producing devices:

5 inches from power lines of 2 kVA or less.

12 inches from fluorescent and HID ballasts

36 inches from 5 kVA or greater power lines

40 inches from transformers and motors

3.4 GROUNDING

A. Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.

B. The contractor shall provide necessary transient protection on the AC power feed, as recommended by the manufacturer. The contractor shall note the type and location of these protection devices as well as all wiring information on the shop drawings and project record drawings.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a factory-authorized service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.

B. Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminals are identified. Provide a list of final tap settings of paging speaker line matching transformers.

C. Testing: Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor's expense. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

D. Cleaning: Prior to final acceptance, clean system components and protect from damage and deterioration.

3.6 SYSTEM DIALING AND TELEPHONE LINE CONNECTION

A. System shall be arranged for Dialing according to assignment of room numbers and staff station numbers relating to a 3-digit room number corresponding to the station location. All administrative and staff telephone instruments shall be labeled according to the final room numbering system. Coordinate this requirement with the ASD Project Manager during final room numbering assignment. All room assignments in the intercom system shall match those in the fire alarm system.

B. Coordinate with ASD Project Manager for connection of all designated analog lines to the intercom head-end equipment. Label all terminations with corresponding analog line extension number.

3.7 OCCUPANCY ADJUSTMENTS:

A. Within 60 days of Final Completion, provide on-site assistance in adjusting sound levels, resetting matching transformer taps, and adjusting controls to suit actual occupied conditions. Provide up to two (2) visits to the site for this purpose. Coordinate with ASD Project Manager for scheduling of all site visits.

END OF SECTION